GODDARD SPACE FLIGHT CENTER

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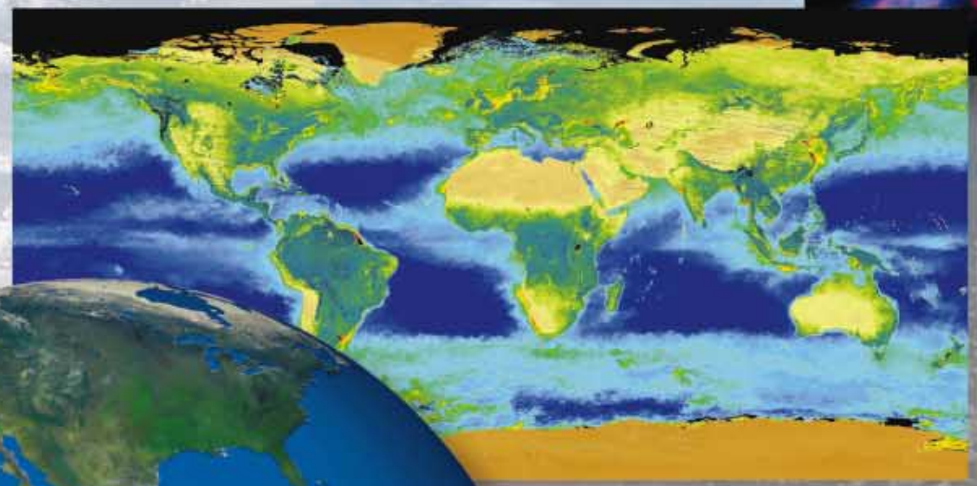

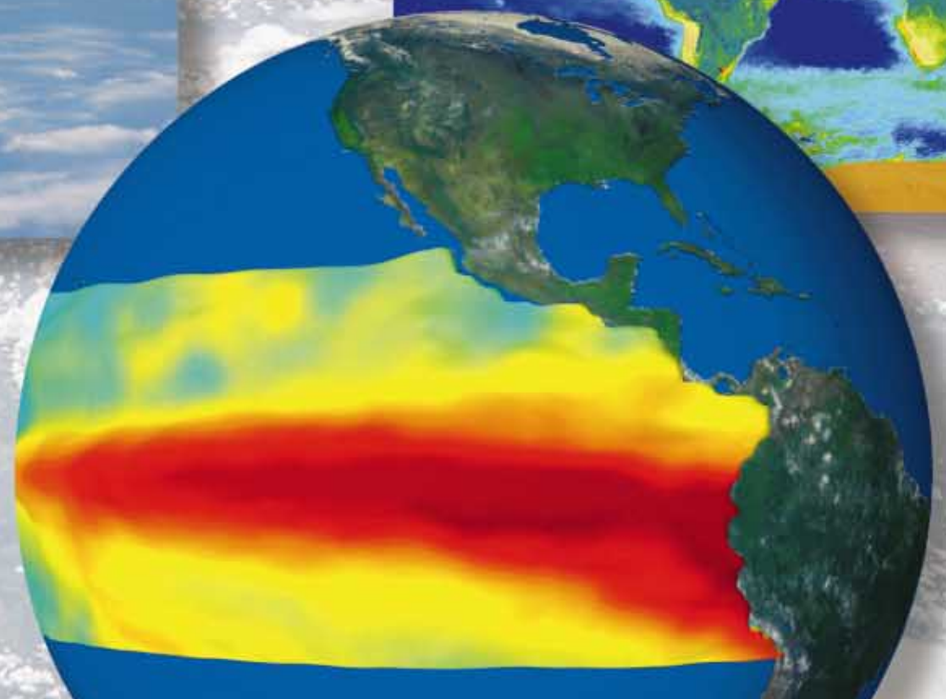

ANNUAL REPORT
1997

National Aeronautics and
Space Administration

Goddard Space Flight Center

Cover: (Clockwise from Top)

Tropical Rainfall Measuring Mission spacecraft undergoes integration and testing at Goddard.

Hubble Space Telescope's Near Infrared Camera and Multi-Object Spectrometer captures an infrared image of the Egg Nebula.

Thousands of satellite images taken by the SeaWiFS instrument between September 1997 and April 1998 are combined to produce this image of the Global Biosphere.

Goddard scientists use satellite data to dramatically visualize the global scale of the effects of the 1997-1998 El Niño.

Inside Cover Background:

Image of Comet Hale-Bopp as captured by the Hubble Space Telescope.

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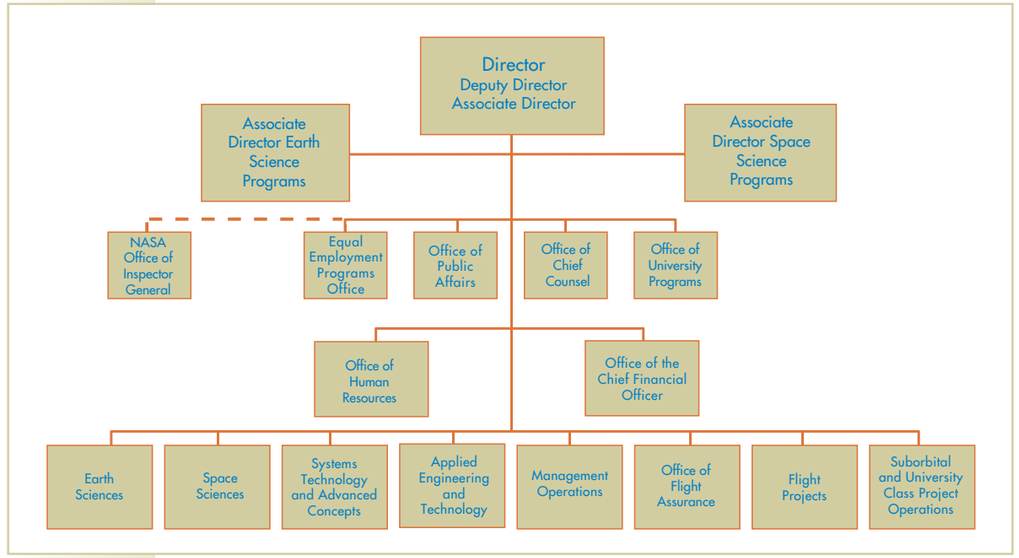
Introduction/Overview

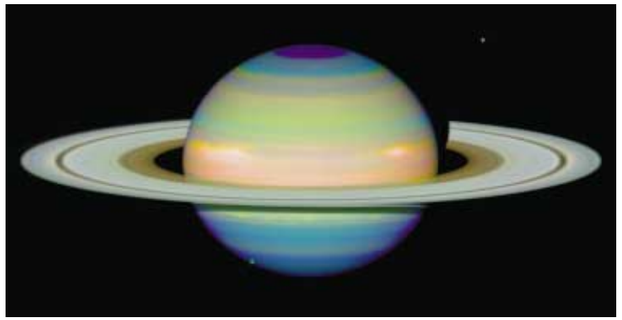
The Goddard Space Flight Center is one of America's premier research laboratories and is a world leader in the development of unmanned satellites and related technologies. Goddard is NASA's Center of Excellence for scientific research, and its 11,800 employees are dedicated to enabling the advancement of Earth and Space Science. Goddard continued its outstanding record of excellence in science and technology in 1997.

During the past year, the Goddard Space Flight Center began to take specific steps to position itself to face the next millennium. In 1997, our scientific researchers focused on black holes and ozone holes, galaxies and the biosphere, while our technologists developed more reliable systems to detect these phenomena as well as faster computers to aid with research. This annual report describes discoveries, findings, and the new knowledge gained as a result of the efforts of the many diverse personnel at Goddard who successfully come together to achieve a common goal. This report highlights achievements in Space Science, Earth Science, advanced technologies, programs and flight projects, and advances in the way Goddard conducts business.

Throughout 1997, there were various technical and organizational challenges for individuals and teams. Many employees became involved with establishing the next phase of the Center's plan to implement our role assigned by the Agency's strategic plan. In March, Goddard began the process of developing a new organizational structure reflective of Goddard's technology development and insertion responsibilities. Two new directorates, the Systems Technology and Advanced Concepts Directorate (STAAC) and the Applied Engineering and Technology Directorate (AETD), were established. Creation of these two organizations, which include personnel primarily from the Mission Operations and Data Systems and Engineering Directorates, will support Goddard's continued move toward a matrixed, team-oriented, and customer-focused organization. STAAC will enhance Goddard's new business and technology planning, while the AETD will provide engineering support for all of Goddard's projects as well as develop technologies to meet current and future science and spacecraft technology needs.



Seventy-eight years ago, Robert H. Goddard wrote a paper entitled *A Method of Reaching Extreme Altitude*. When the paper was published in the Smithsonian Miscellaneous Collections, it became the focus of speculation on travel to the Moon. This paper helped set the course for adventure, challenge, and exploration that the Goddard Space Flight Center is proud to advance into the next century.



Hubble Space Telescope's Near Infrared Camera and Multi-Object Spectrometer captures a false-color image of Saturn.

SCIENCE AND TECHNOLOGY *Achievements*

Since its inception in 1959, Goddard has established an outstanding record of excellence in science and technology. Goddard scientists, often in collaboration with external partners, increased the depth and breadth of scientific knowledge in both the Space and Earth Sciences in 1997.

This Hubble Space Telescope image provides a detailed look at a brilliant "fireworks show" at the center of a collision between two galaxies.

Space Sciences

Goddard's Space Science Directorate seeks to expand scientific knowledge through observational and theoretical research relating to the solar system, our galaxy, and the universe. The Goddard Space Sciences Directorate focuses its resources on three disciplines: High Energy Astrophysics, Extraterrestrial Physics, and Astronomy and Solar Physics.

The Rossi X-ray Timing Explorer (RXTE) attained major success in studies of very compact objects, neutron stars, and stellar-mass black holes, with the direct detection of x-ray pulsar that flash almost 1000 times per second. These observations gave physicists improved knowledge of the behavior of matter at extremely high densities that cannot be duplicated in any laboratory on Earth. Other RXTE observations revealed what may be the twisting of the reference frame of space and time by the rotation of these compact objects. This phenomenon, the Lense-Thirring Effect, is predicted by Einstein's General Theory of Relativity. (Neutron stars are objects with 50 percent more mass than the Sun, compressed into a diameter no greater than that of a major metropolitan area. Black holes are objects whose gravity is so powerful that nothing can escape from them, not even a beam of light.)

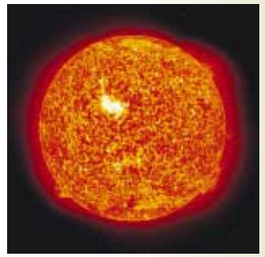
Research with the Japanese/U.S. Advanced Satellite for Cosmology and Astrophysics (ASCA) showed higher iron levels in distant clusters of galaxies than predicted. This evidence shows that processes of heavy element creation may have been active earlier and more intensively in the history of the universe than experts had previously thought. ASCA data on the distant galaxy clusters also suggests that the universe is open and will expand forever.

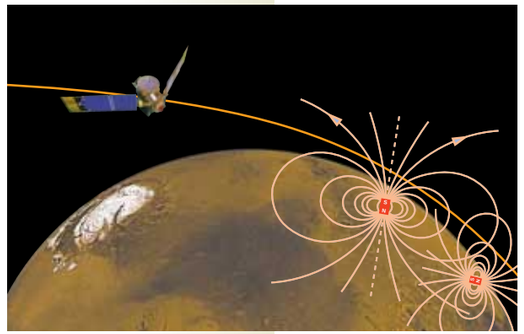
The Energetic Gamma Ray Experiment Telescope (EGRET) instrument on the Compton Gamma Ray Observatory (CGRO) discovered that the Moon is brighter in gamma rays than the quiet Sun, although the Sun may outshine it when active regions and flares disturb the solar atmosphere. EGRET found that the diffuse gamma rays that make the whole sky glow at high energies are much brighter than previously thought at the highest gamma ray energies observed by the instrument.

The Space Telescope Imaging Spectrograph (STIS), installed on the Hubble Space Telescope (HST) during the second servicing mission in February, separates ultraviolet, visible, and near-infrared light to measure the composition, temperature, motion, and other physical properties of celestial objects. Foremost among the STIS discoveries was the detection of a black hole with a mass of at least 300 million times that of the Sun. This black hole is located at the center of the galaxy M84.

In a major advance in theoretical astrophysics, new computer simulations of the way in which stars change with time showed that many of the oldest known stars are much younger than previously calculated. These new calculations helped to resolve the dilemma that some stars appeared to be older than the universe itself.

Solar and Heliospheric Observatory reveals bright flares and jets of hot gas spewing from the Sun into space.





Early results from the magnetometer on the Mars Global Surveyor reveals localized magnetic sources in the crust of Mars in this schematic representation.

During 1997, instruments on the Solar and Heliospheric Observatory (SOHO) continued to weigh in with new discoveries about our Sun. Scientists discovered so-called "jet streams," fast-flowing rivers of electrified gas or plasma, inside the Sun. Other plasma flows inside the Sun were found to transport material much like the trade winds in the Earth's atmosphere; they may help scientists explain the 11-year sunspot cycle. Additionally, observations of a complex array of magnetic features on the solar surface, a so-called "magnetic carpet," suggested that this phenomenon may be responsible for heating the outer atmosphere of the Sun (or corona) so that it is about 300 times hotter than the solar surface. (On Earth, the atmosphere is generally increasingly colder with altitude.) Scientists theorize that without the "magnetic carpet" there might be little or no corona around the Sun.

On September 11, the Mars Global surveyor (MGS) successfully completed its Mars orbit insertion burn. Data collected by instruments on-board MGS have shown that the magnetic field of Mars does not produce an organized global effect similar to the magnetic field on Earth but consists of individually strong and highly localized magnetic concentrations. On Earth, a compass needle always points towards the magnetic North Pole, but on Mars such a needle would point to the nearest magnetic concentration. This discovery means that there is no magnetic dynamo within Mars that is generating a magnetic field at the present time (unlike Earth where such a dynamo operates continuously). MGS instruments also determined the way in which the temperature of the Mars atmosphere changes vertically and observed a high-speed vortex of polar winds and dust storms. Goddard scientists have a long history of developing and operating instruments for planetary missions like Cassini, Near Earth Asteroid Rendezvous (NEAR), Lunar Prospector, Galileo, and many more. The data from these instruments have led to many unique discoveries about our solar system similar to those outlined above.

The fleet of spacecraft incorporated in the International Solar-Terrestrial Physics (ISTP) program made the first Sun-to-Earth observations of solar disturbances as they originated on the Sun, propagated through interplanetary space, and struck and influenced the Earth's magnetosphere. One spacecraft in the fleet, WIND, detected an extended and remarkably turbulent "plasma wake" behind the Moon, a basic feature of the near-Earth environment of interplanetary space.

In 1997, scientists and engineers continued studies of NASA's Next Generation Space Telescope (NGST). When NGST focuses on the distant universe, astronomers will observe the formation of the first galaxies and supernovae and trace the formation of elements from the primordial hydrogen and helium. Technologically, NGST will re-define the state of the art in lightweight optics and infrared detectors.

To solve NGST's technical challenges, strategic partnerships were formed between Goddard, other NASA Centers, industry, and international organizations. The focus of efforts is on developing technologies to enable the "order-of-magnitude" performance improvements necessary to achieve NGST's scientific goals and to achieve these goals at an affordable cost. NGST is a major cornerstone in the Origins Program of NASA's Office of Space Science. Development of NGST is planned to start around 2003/2004 with the launch to follow in 2007.

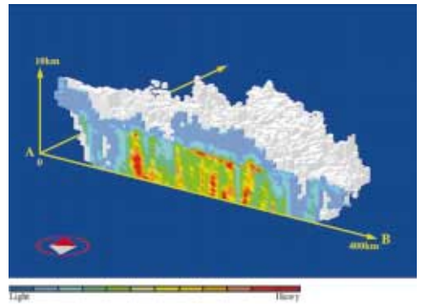
Earth Sciences

Goddard's Earth scientists explore the inner and outer layers of our planet from the viewpoint of space. The activities of the Earth Sciences Directorate cover all major aspects of the Earth Sciences, from studies of the solid Earth and its interior to the hydrosphere, biosphere, and atmosphere. Major research objectives of the Earth Sciences organization include assessing the long-term effects of human and natural environmental change on global climate; understanding and predicting annual to interannual climate variability; assessing the environmental effects of tropospheric pollutants; and modeling the atmosphere, ocean currents, tectonic plate motions, and the Earth's magnetosphere. The long-term goal of this research is to combine these studies to yield a greater understanding of the Earth by developing an integrated model of the Earth as a system.

Artist concept shows the Tropical Rainfall Measuring Mission in orbit.

Recent results from the Tropical Rainfall Measuring Mission (TRMM) spacecraft indicate that passive microwave observations can be used to delineate convective rain from stratiform rain and to derive estimates of the latent atmospheric heating profile (due to condensation of water vapor). These results will allow TRMM observations to be utilized to study not only the impact of the heating on the global climate but also the heating distributions related to convective systems and cyclonic storms, including hurricanes. The TRMM observations will also be used to calibrate precipitation estimates based on data from other satellites (including polar orbiting and geosynchronous) and rain gauge networks to produce merged surface precipitation estimates of higher quality than previously available. Ground validation activities are supported by the TRMM laboratory.

In the past year, Goddard utilized data from several spacecraft to monitor the day-to-day evolution of the El Niño event. The NASA Seasonal to Interannual Prediction project was initiated at Goddard to assess the impact that remotely sensed observations have on El Niño prediction skill. NASA observations of the current El Niño have been produced with animation to assist in communicating the phenomena to researchers and the general public.



Tropical Rainfall Measuring Mission captures Cyclone Pam on the second day of the Precipitation Radar's operation, including this 3-dimensional cross-section of rainfall.

Total ozone observations from the Total Ozone Mapping Spectrometer (TOMS) instruments during March 1997 revealed an extensive region of low ozone values in the Arctic region centered near the North Pole. The March 1997 average ozone values are 40 percent lower than values observed during the same period in 1979-1982. The rapid decline of total ozone over the Arctic region during February and March 1997 is consistent with in-situ chemical loss. Values began to recover in late March and early April.

SeaWiFS, an instrument on the commercial SeaStar spacecraft, was launched on August 1. The purpose of the Sea Viewing Wide Field-of-View Sensor (SeaWiFS) project is to provide quantitative data on global ocean bio-optical properties. Initialization of operational processing occurred in September, and data was delivered to NASA the same day. A global reprocessing of all SeaWiFS data has been initiated as a result of a post-launch recalibration based on Marine Optical Buoy (MOBY) data.

The NASA Scatterometer (NSCAT) was launched on board the Japanese ADEOS satellite on August 16, 1996. NSCAT provided an extensive data set of all weather wind observations over the global oceans until contact with ADEOS was lost in 1997. A detailed geophysical evaluation of the initial NSCAT data sets was performed to determine the error characteristics of these data and their applicability to ocean surface analysis and weather prediction. Results from this evaluation indicated that NSCAT data is extraordinarily useful. The experiments showed that NSCAT has the ability to correct major errors in analyses over the oceans and also to improve numerical weather prediction. Forecast experiments show approximately a 24-hour extension of useful forecast skill in the Southern Hemisphere, while the impact was slightly less in the Northern Hemisphere.

In April, Goddard scientists reported that the Earth's northern latitudes have become approximately 10 percent greener since 1980. This is due to more vigorous plant growth associated with warmer temperatures and higher levels of atmospheric carbon dioxide. Analyzing data gathered by sensors aboard weather satellites, researchers found that during the peak summer growing months of July and August, heightened greening occurred north of the 45th parallel from 1981 to 1991. According to new findings, the northern climes are greener and stay green longer. Scientists affirmed an earlier report that the spring season, on average, is arriving about a week earlier and the autumn season a bit later, making the growing season on average 12 days longer, give or take 4 days. Since the study was completed, further analyses have indicated that both the enhanced greening and the longer growing seasons have continued through 1994, the last year data was analyzed.

Goddard scientists and their international collaborators have recently developed a comprehensive model of the Earth's geomagnetic field. The new model is superior to previous models because it includes a physically more realistic model of external geomagnetic fields and their contribution to the total field measured by spacecraft. Improved modeling of the external geomagnetic fields has allowed the isolation and recognition of previously unknown north-south magnetic fields that originate in the Earth's lithosphere. Interpretation of these "new" features is improving our knowledge of the origin and evolution of deep, large-scale lithospheric structures.

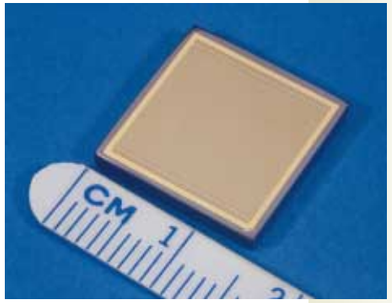
In November 1996, a catastrophic glacier outburst flood was triggered by a subglacial eruption beneath the icecap in southern Iceland and produced a discharge that blanketed the region. A Goddard team analyzed the geodetic scanning laser altimetry acquired in June 1996 (pre-flood) and in May 1997 (post-flood) from the WFF Airborne Terrain Mapping (ATM) system. In May 1997, the flight lines flown in 1996 were repeated in order to measure differential topography for the central sandur (glacial delta) region. Results indicate that the integrated topographic changes favor accretion of new sediment (rather than erosion) as a consequence of the flood. Without the laser altimetry, the interpretation of the quantitative effects of the November 1996 event would have been ambiguous and would have likely indicated a net loss of material. The results from this study show that repeat pass or differential scanning laser altimetry is a powerful remote sensing method for measuring the sometimes subtle topographic changes associated with major natural hazard events.

The Ice, Cloud and Land Elevation Satellite (ICESat) is an Earth Science mission designed to answer fundamental questions about the growth or shrinkage of the polar ice sheets and future global sea levels. Using an instrument designed and developed by a university and industry team led by Goddard, the Geoscience Laser Altimeter System (GLAS) instrument on ICESat will also measure the heights of clouds for studies of the Earth's temperature balance and will measure land topography for a variety of scientific and potentially commercial applications. The ICESat mission is scheduled to be launched into a near-polar orbit in July 2001.

Advanced Technology

Goddard continued its partnership with the Air Force Research Laboratory in the production of several cryogenic coolers, including the Ball Stirling Cycle Cooler and the Creare Turbo Brayton Cooler. The Hubble Space Telescope project will fly the Turbo Brayton Cooler on a technology demonstration experiment on STS-95 in October 1998. While the prototype cooler is now undergoing life testing at the Air Force Research Laboratory, an advanced version of this cooler is being developed at Goddard. These coolers, designed to control the heat produced by detectors in the 4° to 10° Kelvin temperature range, have been proposed for flight on the NGST and Constellation X missions.

Advancing sensing performance and operational capabilities through algorithm and receiver development, the Global Positioning System (GPS) "GPS On A Chip" program is a partnership among the Jet Propulsion Laboratory (JPL), Goddard Space Flight Center, and Stanford University to develop a credit card-sized, high-performance GPS receiver weighing less than 300 grams and consuming less than two watts of electricity. The Goddard GPS Test Facility is a unique development and testing laboratory for satellite GPS receivers. A critical segment of Goddard's GPS technology plan, the facility enables development and demonstration of GPS sensors prior to and in support of space flight projects.



Sample cadmium zinc telluride detector used to detect soft x-rays and gamma rays.

The Ultra-Precision Optics Partnership (UPOP), formed between Goddard and three industrial partners, made credible advances in 1997. This partnership will advance mirror technology for NASA's high-contrast imaging applications and for Extreme Ultraviolet (EUV) photolithographic systems to produce line widths of 1 micron. The partnership provides for the effective exchange of technical information, the creation of a manufacturing testbed at one of the manufacturer's plants, and the production of testbed mirrors to advance ultra-precision optics.

Magnetically Suspended Reaction Wheels providing ultra low jitter.

A promising new in-house magnetic bearing design from Goddard's Electro-mechanical Systems Branch and Guidance, Navigation and Control Branch initiated the Magnetically Suspended Actively Reduced Dynamic Imbalance (MASAREDI) reaction wheel initiative. The goal of this initiative, developed in partnership with industry, is to build a magnetically suspended reaction wheel to reduce jitter effects. This technology has potential for use on the NGST as well as other Earth and Space Science missions that require low-vibration (quiet) wheels to achieve the precise levels of pointing and stability required.

Of the many space program technologies that have yielded medical benefits, two technologies advanced the field of cancer detection in 1997: the GLAST Charge-Coupled Devices (CCD) and Acousto-Optical Tunable Fibers (AOTFs). Goddard is collaborating with the University of Arizona Medical School to develop hard x-ray detectors with very small pixels, using cadmium zinc telluride (CZT) technology. The small pixels, or image-sensing elements, are used by astronomers to more accurately locate celestial gamma ray burst sources and are used by doctors for early detection and precise location of very small tumors in the human brain. The AOTFs that NASA scientists use to determine the characteristics of other planets' atmospheres are

being adapted into devices to identify whether human cells are cancerous or normal. This device was tested in 1997 and yielded images with a resolution that far exceeds conventional x-ray film imaging.

Satellite builders are expressing great interest in star sensors that autonomously provide attitude determination data while reaching sub-arc-second performance levels. Additionally, they want them smaller, lighter, and cheaper. As a result of the many requests from the commercial sector and from within NASA, a technology program was created at Goddard to focus commercial star sensor vendors on advances in microelectronics, processors, detectors, and algorithms. The purpose of the program is to revolutionize star sensor design with respect to both autonomy and performance while decreasing costs, size, and power. This multi-phase, multi-year program will not only inject revolutionary technologies into future star sensor designs but will also enhance the capabilities of existing sensors. The program's four phases were developed to provide both a roadmap and an incremental measurement tool for star sensor improvements.

In support of Agency initiatives, several quick reaction fabrication jobs were performed for the Johnson Space Center (JSC) to support the International Space Station. Work included the manufacture of training versions of the Russian Simplified Aid for EVA Rescue (SAFER) EVA suit and hardware assembly. Additionally, Goddard continued to develop its partnership with industry to enable the uses of new technologies such as programmable substrates for space applications. As a result of this partnership, a four-layered rack memory module for use by designers for satellite/instrument interface has been developed.

In 1997, a project was approved to develop and demonstrate those technologies required to support balloon missions lasting up to 100 days at heights above 33.5 kilometers (kms). The Ultra Long Duration Balloon Project (ULDB) managed at the Wallops Flight Facility consists of four major elements: Vehicle and Recovery, Ballooncraft, Mission and Operations, and Science Instrument. The development project is scheduled to conclude with a demonstration flight in the year 2000.

Another highlight at the Wallops Flight Facility in 1997 was the first nearly around-the-world balloon flight in the Northern Hemisphere. Flying at approximately 120,000 feet above sea level, the NASA scientific balloon completed its flight with a successful test of the balloon's systems. The primary purpose of the flight was to test balloon technologies that will allow scientists to fly payloads for long durations in the Northern Hemisphere. A cosmic ray experiment from NASA's Marshall Space Flight Center (MSFC) was onboard, providing credible scientific results. This new Northern Hemisphere long duration balloon flight capability provides a very significant enhancement of the existing program by more than doubling the fraction of the sky that can be observed during a long-duration flight.

Programmatic *Achievements*

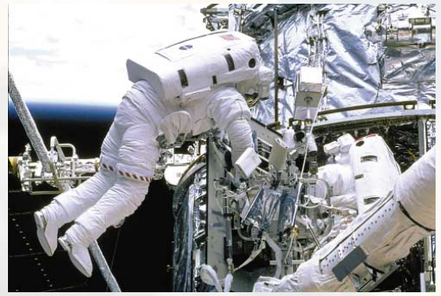
Goddard manages projects at different funding levels for a variety of customers, both internal and external. These efforts range from managing launch processing for all spacecraft for the Agency to managing and producing platforms for Earth and Space Science observations to manufacturing instruments that fly on various spacecraft.

The year started off with the stunning success of the Second Servicing Mission for the Hubble Space Telescope and culminated in late autumn with the successful launch of the Tropical Rainfall Measuring Mission. Other achievements included the outstanding successes of GOES-10 and the Advanced Composition Explorer.

During 5 days of Extravehicular Activities (EVAs), the crew of STS-82 flawlessly performed major maintenance and upgrades to the orbiting HST. These activities, scheduled prior to the launch of Hubble Space Telescope (HST) in April 1990, included replacing scientific instruments with dramatically upgraded technology that is assisting astronomers from around the world to probe the universe in greater detail. In addition to the STIS instrument previously described, the Near Infrared Camera and Multi-Object Spectrometer (NICMOS) is providing finely detailed images and wide views of very distant objects. Because NICMOS sees in the longer, redder wavelengths of the near infrared, it will peer farther into the universe and further back in time than previous HST instruments. NICMOS can also see through obscuring dust that shrouds stellar nurseries. This will help us determine how stars and planets were born.

TOP: Astronauts perform an Extravehicular Activity during STS-82, the second Hubble Space Telescope servicing mission.

BOTTOM: The Advanced Composition Explorer begins its 2-year mission with a successful launch aboard a Delta II rocket.



On April 25, the Geostationary Operational Environmental Satellite-K (GOES-K) was successfully launched and placed in on-orbit storage. Stored 22,300 miles above the Earth, positioned midway between the East and West Coasts of the U.S., the satellite was renamed GOES-10 when it achieved geostationary orbit. GOES-10 will be ready if either of the two currently operating GOES spacecraft fails. GOES-10 will greatly enhance human safety and reduce the risk of economic losses by improving early awareness of severe weather conditions such as hurricanes.

The Earth is constantly hit with a stream of accelerated particles arriving not only from the Sun but also from interstellar and galactic sources. The Advanced Composition Explorer (ACE) streaked to orbit from the Cape Canaveral Air Station on August 25. The ACE Observatory, equipped with high-resolution sensors and three monitoring instruments, is designed to help understand the origin of matter in our bodies, the Earth, and the universe as a whole. The project is managed by the Explorers Project at Goddard. When launched, ACE was $30 million under budget and was launched within 4 days of a target established more than 3.5 years earlier.

Goddard manages projects with international partners, including NASA's Tropical Rainfall Measuring Mission (TRMM). TRMM was successfully launched from Japan's Tanegashima Space Complex on November 27. The TRMM mission is the first international Earth Science mission dedicated to measuring tropical and subtropical rainfall through microwave and visible/infrared sensors. It includes the first spaceborne radar, supplied by the Communications Research Laboratory of Japan. At launch, the observatory weighed 7,920 lbs. (3,600 kg) and was the largest spacecraft built, integrated, and tested at Goddard.

Goddard delivered several instruments for the Cassini mission to Saturn. The Composite InfraRed Spectrometer (CIRS) is an infrared sensing interferometer, and the Ion and Neutral Mass Spectrometer (INMS) measures the positive ion and neutral environments of Saturn's icy rings. Both instruments are located on the Cassini Orbiter spacecraft. The Gas Chromatograph-Mass Spectrometer (GCMS) is located on the Huygens Probe. The Cassini spacecraft includes the Huygens probe, which is designed to take measurements of Titan's atmosphere. Goddard completed the integration, testing, and delivery of the instruments, and Cassini successfully launched on October 15 from the Kennedy Space Center (KSC). All instruments are performing nominally as Cassini continues toward an encounter with Saturn in July 2004.

The topography of the Earth's land surface is a critical parameter in many Earth system science studies. Unfortunately, much of the topography of the Earth is not accurately known and/or lacks a consistent geodetic reference frame. The best digital versions of topography, suitable for use in global analysis and modeling activities, are composed from multiple sources that are often of unknown quality. The Shuttle Laser Altimeter (SLA) experiment is a Pathfinder experiment designed to test advanced lidar technologies for characterization of land topography, surface roughness, and vegetation height from Earth orbit.

In August, the STS-85 Shuttle mission posed the largest and most complex mission in the history of the Shuttle Small Payloads Project (SSPP). Two Goddard-managed payloads, the Technology Applications and Science (TAS-01) payload and the International Extreme Ultraviolet Hitchhiker-02 (IEH-02) payload, flew aboard the Space Shuttle Discovery for the 12-day mission. Using standard avionics on the TAS-01 payload enabled command and transmission of experiment data to and from the payload.

A 3-stage sounding rocket is prepared for launch at the NASA Goddard Wallops Flight Facility, Wallops, Virginia.

In another activity to support Space Science, the Spartan 201 spacecraft was successfully integrated into the Orbiter Columbia for the STS-87 mission for an unprecedented fourth flight. During the November mission, the White Light Coronograph and Ultraviolet Coronal Spectrograph solar science instruments as well as several other technology experiments flew on the spacecraft. A commercially produced personal computer hard disc drive was used as a backup data storage device in the White Light Coronograph experiment, an example of Goddard's emphasis on increased use of Commercial-Off-The-Shelf (COTS) equipment.

The NASA Sounding Rocket program, managed at the Wallops Flight Facility, launched 29 rockets during 1997 with a 97 percent mission success rate. WFF personnel supported launches from Alaska, New Mexico, Virginia, Australia, and Norway. The scientific experimenters represented nearly two dozen different educational, governmental, and industrial organizations. Scientific instruments gathered data in several disciplines, including upper atmospheric research, infrared astronomy, and cosmic and heliospheric physics.

The Wallops Flight Facility conducted 26 balloon flights in support of the scientific community in 1997. Experiments representing a variety of scientific disciplines, including upper atmosphere research, high-energy astrophysics, infrared astronomy, and cosmic and heliospheric physics, were flown from permanent and remote launch sites throughout the world, including Texas, New Mexico, Alaska, Canada, and Brazil. This year the program enjoyed an overall balloon success rate of 95 percent and a mission success rate of 85 percent.

Preparations began in 1997 for the second launch campaign originating from Puerto Rico, designated as Coqui Dos. Eleven suborbital rockets will be launched from February through April 1998 to examine atmospheric turbulence, composition, and electrical properties that will ultimately improve the reliability of radio and satellite communications.

A temporary sounding rocket launch pad set up in Puerto Rico for the Coqui Dos campaign.

The Microwave Anisotropy Probe (MAP) is a Space Science mission designed to probe conditions in the early universe. A smaller and more sensitive version of the highly successful Cosmic Background Explorer (COBE) mission of the mid-1980s, MAP is a partnership between Goddard and Princeton University. The MAP project is a part of the NASA's Office of Space Science Explorer program and was selected for launch in 1996. Flight components for the MAP mission are in development with delivery of all components planned for 1998.

The High Energy Solar Spectroscopic Imager (HESSI) mission was selected for flight hardware and mission development in the Small Explorer (SMEX) Announcement of Opportunity in June. HESSI will study particle acceleration, energy release in solar flares, and powerful explosions on the Sun. HESSI is scheduled for launch in July 2000.

The Transition Region and Coronal Explorer undergoes checkout prior to its successful April 2 launch.

In November 1997, the SMEX project completed the integration and qualification testing of the Transition Region and Coronal Explorer (TRACE) Observatory, which is closing the development phase of this mission for $9.7 million less than its cost cap. TRACE is scheduled for launch in February 1998. The objective of the TRACE mission is to explore the three-dimensional magnetic structures that emerge through the visible surface of the Sun. This surface defines both the geometry and dynamics of the upper solar system.

After rigorous peer review, the Vegetation Canopy Lidar (VCL) mission was selected as the first Earth System Science Pathfinder mission. The University of Maryland proposed the VCL mission based on laser remote sensing technology developed in Goddard's Laboratory for Terrestrial Physics. The VCL mission has three primary science objectives: (1) characterizing land cover for terrestrial ecosystem modeling, monitoring, and prediction; (2) characterizing land cover for climate modeling and prediction; and (3) producing a global reference data set of topographic elevations and including subcanopy topography. After launch in 2000, the VCL mission will provide unique data sets on forest canopy heights and forest coverage worldwide, which will lead to improved understanding of important environmental issues, including climatic change and variability, loss of biodiversity, and sustainable land use.

Goddard successfully completed the fabrication, integration, and testing of the X-Ray Spectrometer Detector System Engineering Unit, a subsystem on the Astro-E mission. Astro-E is a joint mission between NASA and the Institute for Space and Astronautical Sciences of Japan. Astro-E will probe the x-ray universe and is scheduled for launch in 2000.

INSTITUTIONAL *Achievements*

Personnel at Goddard led or participated in a number of activities that correlated with both the Agency's strategic goals as well as Goddard's strategic goals. A select list of institutional achievements and descriptions of the progress on several internal and external processes that were re-engineered in 1997 is documented below.

During FY97, processes were identified to develop the FY00 budget using full cost management. The Integrated Financial Management Project (IFMP) was established at Goddard. Creation of the IFMP initiated the process of establishing an Agencywide contract designed to standardize its business practices. Serving as the Agency procurement lead for IFMP, Goddard awarded a contract in November that included six components: the core financial system, the Executive Information System, budget, travel, procurement, and time and attendance. This program will establish a standardized financial management capability for the Agency that will meet standards and policies for federal financial management.

The Indefinite Delivery, Indefinite Quantity (IDIQ) Rapid Spacecraft initiative became a major activity at Goddard, revolutionizing the NASA spacecraft procurement process. These innovative IDIQ contracts are set up to allow any NASA Center, as well as other U.S. government agencies, to buy an existing spacecraft design from something similar to a General Services Administration (GSA) schedule. The Rapid Spacecraft Development Office established the contract mechanism required to permit the rapid acquisition of spacecraft for the Agency's projects, reducing the normal 6-to-9 month process to an average of 30 days. The IDIQ "catalog" contains 16 different spacecraft with a wide range of performance and price parameters and many optional enhancements to each baseline spacecraft.

Goddard personnel are working with management on the International Standards Organization (ISO) 9000 activities in support of the Center's ISO certification process. The effort has proceeded smoothly, and the Center expects to be ISO 9000 certified by FY99.

In July 1997, Goddard opened the Integrated Mission Design Center (IMDC). The IMDC is a national resource dedicated to innovation in space mission design and advanced concept development to increase scientific value for NASA and its customers. The primary IMDC objective is to provide flexible and responsive mission and spacecraft design support to the scientific community. The IMDC is already producing powerful results for the Agency and its front-line customers: scientists from around the globe who are pursuing Earth and Space Science research and mission development. The IMDC consistently develops mission concepts in one week by integrating a resident team of engineers in a world-class facility with an information system that links the requisite engineering tools and products.

To compensate for aerodynamic drag forces that had degraded the Compton Gamma Ray Observatory (CGRO) orbit to 432 km, reboost operations began on March 24 and were completed in June. Successful completion of these operations restored the observatory's orbit to approximately 520 x 505 km, which will keep the mission on orbit until 2005.

With less than 6 months lead-time, Goddard led an Agencywide procurement team that awarded a single Agency travel services contract by the need date. A number of innovative techniques were used to meet the extremely compressed schedule, including reduced reporting requirements, streamlined oral presentations, and an award based upon initial offers. The team received an Agencywide award for this remarkable accomplishment.

The Wallops Mission 2000 Implementation Plan provided the framework for implementing a new mission for Wallops Flight Facility's vision of the future. It describes Wallops' business strategy and addresses both existing and planned initiatives, noting their effect on Wallops' workforce and infrastructure. Developing the Wallops Mission 2000 Implementation Plan required that a number of key elements be identified, including the establishment of strategic partnerships with existing tenants, other government agencies, and commercial partners using the Wallops core infrastructure and expertise as a foundation from which to strengthen existing and to pursue new business initiatives.

In a key institutional process improvement during FY97, the senior promotion process was revised to make it more widely visible and to include peer reviews for the engineering and administrative candidates similar to scientist candidates. One key feature of the new process introduced the review of promotion nominees by panels whose members are from outside the nominee's organization. These panels provide their input to the Manpower Utilization Review Council (MURC) for its consideration along with the nominating organization's justification.

In 1997, the conversion of the Goddard library to an electronic system was initiated. Since becoming one of the first federal libraries to provide access through the World Wide Web (WWW), the Goddard library has significantly increased its electronic services (over 47,000 hits from university libraries occurred in 1997). In addition to providing full-text electronic access to 35 journals, the system provides an electronic library request form, book requests and renewals by e-mail, and "webliographies" on specific topics of interest. The library recently teamed with the National Science Foundation, the National Institute of Standards and Technology, and the Naval Research Laboratory to provide users access to the Web of Science, covering over 5,300 scientific and technical journals. By teaming with other agencies, Goddard saved $150,000 over 4 years. The library also received a certificate of registration for its first copyright for a computer program that allows easy connectivity to library data.

One of two new, highly automated multi-mission ground stations, the Svalbard Ground Station in Norway will support NASA missions such as Quikscat and EOS PM-1.

Two new NASA multimission ground stations were installed in 1997 to support S and X band satellites in polar orbits. One station is the Svalbard Ground Station (SGS) located in Norway. The other is located at Poker Flat, Alaska, and is known as the Alaska Ground Station (AGS). These identical 11-meter systems are highly automated, thus reducing operational costs, and are configured to support the local launch ranges and satellites. The combination of these two new stations and the existing 10-meter station at McMurdo Station, Antarctica, constitutes a polar network that assures contacts in excess of 13 minutes duration at least twice per orbit for existing and future polar orbiting spacecraft.

The Achieving Competence in Computing, Engineering, and Space Science (ACCESS) program, which originated at Goddard 9 years ago as the only program in technical disciplines in the Agency targeted toward students with disabilities, was expanded to three other Centers in 1997. This unique program is managed by the American Association for the Advancement of Science (AAAS) and Goddard provided technical assistance and overall guidance for this unique initiative. One of Goddard's 1996 ACCESS participants was named a Rhodes Scholar in November. Twenty-three students participated in ACCESS at Goddard in 1997.

Goddard intern Jonathan Winkler is named a Rhodes Scholar. From L to R: Michael Hartman, Laureen Summers, Gerard Williger, Winkler, Joe Rothenberg, Carol Crannell, and Dillard Menchan.

The Technology Transfer and Commercialization Office established a new program to foster the use of environmental and Earth resource data from satellites and other sources by public- and private-sector regional institutions serving as Regional Validation Centers (RVCs). Based at Goddard and several universities, RVCs utilize NASA's remotely sensed data to develop practical regional applications. For example, the University of Southwestern Louisiana is using atmospheric and oceanographic data to better predict the path and intensity of hurricanes in the Gulf of Mexico, benefiting residents and the regional oil industry. State and local governments responsible for resource management, disaster relief, education, and commercial development can benefit from RVCs' efforts.

Goddard's NASA Workmanship Training Center was involved with a major outreach effort with Prince George's Community College, Lanham, Maryland, in a teaching cooperative. Students from outside the NASA environment received training in high-reliability soldering and workmanship standards. This unique partnership provided students with the opportunity to obtain fundamental skills and procedures necessary in building spacecraft and electronic instruments. The NASA Training Center provides the facility, materials, equipment, and instructors to the Prince George's Community College.

Technicians inspect the Student Experiment Module "Getaway Special" experiment canister prior to shipment to NASA's Kennedy Space Center.

The Space Experiment Module (SEM) program completed its second flight aboard STS-85 in August 1997 on the Technology Applications and Science (TAS-01) Hitchhiker bridge. SEM drew international attention for its programmatic potential and its ability to bring Space Science directly to the classroom via the Internet. NASA provides experiment modules to selected schools that have designed microgravity experiments to fly on the Space Shuttle. The program is administered almost solely by Internet access, allowing schools to download software, give feedback, and learn about other participating organizations.

A cooperative program was initiated with the Worcester Polytechnic Institute (WPI) in which sixteen engineering and computer science students spent 8 weeks at Goddard supporting Research and Development (R&D) activities. Concentrating primarily in the areas of optics, electrochemical plating, environmental test facility automation, and computer networking, the program achieved its goal of providing a significant hands-on learning experience for the WPI students while at the same time providing Goddard with a highly capable and motivated staff augmentation to meet ever-growing engineering demands. Based on the success of the 1997 pilot, the effort will be expanded in 1998.

Amateur radio proved to be a reliable space accessory starting in 1983 when a portable unit was manifested into orbit on the Space Shuttle Columbia. Carried on 24 Shuttle flights to date, the Shuttle Amateur Radio Experiment, or SAREX, is the most-flown payload aboard the Space Shuttle. The Russians will be installing a permanent amateur radio facility in their Mir Space Station in 1998. One of the first approved payloads for the International Space Station is a low-cost, 2-foot-cubed, 60-pound rack of amateur radio electronics proposed by a small group of Goddard engineers. The Amateur Radio International Space Station (ARISS) program is designed to transmit vocal messages to and from the space station and send space-to-Earth low-quality video images. All amateur radio activities are an important part of NASA's educational outreach service, with the primary goal to link space vehicles to classrooms around the world.

Goddard's INTERNAL AND EXTERNAL Community Activities

President's Quality Award

Goddard was one of eight federal organizations recognized as a Quality Award Recipient for highly successful quality management accomplishments under the Office of Personnel Management's (OPM) President's Quality Award (PQA) program. The PQA program is very much like the Malcolm Baldridge National Quality Award for private sector companies and consists of a structured application development and rigorous review process, followed by on-site visits. Applicants were graded in the following categories: leadership, information and analysis, strategic planning, human resources development and management, process management, business results, and customer focus and satisfaction. A panel of judges visited Goddard in January, and Goddard was presented its award at a ceremony on July 10.

Wallops Mission 2000 Delivery Day

The Wallops Mission 2000 Plan was unveiled on July 21 at the Wallops Flight Facility, Wallops Island, Virginia. Joining the NASA Administrator, Daniel Goldin, were Maryland Senators Barbara Mikulski and Paul Sarbanes, Maryland Congressman Wayne Gilchrest, Virginia Congressman Herbert Bateman, and Goddard Center Director Joseph Rothenberg. The Wallops Mission 2000 plan expands the current focus on suborbital programs to include small orbital payloads, including the small payloads project for the Space Shuttle Program.

Focus On Our Future

During 2 days in May, members of the Goddard communities at Greenbelt and Wallops had the opportunity to learn about the organizational change process through participation in "Focus On Our Future" Day. Several thousand people at Greenbelt and the Wallops Flight Facility took advantage of this opportunity by interacting with and learning from experts in the fields of change management, customer service, individual and organizational development, career planning, stress management, health, and work-home balance. Activities included keynote presentations, morning and afternoon concurrent workshops, self-guided walking tours, showcase activities, and booths and displays on the Greenbelt mall.

TOP: Goddard Center Director, Joe Rothenberg (center), holds a Quality Achievement Award flanked by NASA Deputy Administrator, John Daily (left), and James Lee Witt, Director of the Federal Emergency Management Agency (right).

CENTER: Maryland Senator Barbara Mikulski is briefed on the preparation of a scientific payload during a tour of the Wallops Flight Facility.

BOTTOM: Motivational speaker Loretta LaRouche "crowns" Goddard Director, Joe Rothenberg during Focus On Our Future Day activities.

Celebrate Goddard Day

The second annual Celebrate Goddard Day, intended to celebrate the diversity of people who make Goddard such a unique place to work, was held on September 11. Anticipation of the event motivated more than 4,000 employees and their families to participate in and enjoy a variety of activities. The countries, cultures, and diversity represented in Goddard's workforce were celebrated in food, entertainment, and educational activities.

Scientific Knowledge for Indian Learning and Leadership

The Scientific Knowledge for Indian Learning and Leadership (SKILL) program won the 1997 National Science Foundation Presidential Award for Excellence in Science, Mathematics, and Engineering Mentoring. This program, offered through the South Dakota School of Mines and Technology, provides extensive classroom and laboratory experience for Native American students in grades 6-12. The mission of the program is to develop and support academic training emphasizing mathematics, science, and engineering. Goddard has supported this program since its inception in 1993.

Students explore the range of science and educational data available on-line during Goddard's first Education Showcase.

Education Showcase

Goddard held its first Education Showcase on October 17. The event, attended by both Goddard employees and local educators, was offered as an opportunity for Goddard personnel to share their programs and accomplishments over the past year. Over 75 exhibitors displayed their educational projects. Additionally, nearly a dozen seminars were offered to local educators as a part of the Showcase.

Stevens Institute Distance Mentoring Program

During 1997, Goddard's Hispanic Advisory Committee for Employees (HACE) implemented a joint distance mentoring program between Goddard, the Stevens Institute of Technology, and three school districts in New Jersey that have significant Hispanic populations. The distance mentoring program pairs Goddard Hispanic professionals with eight middle school science teachers and their students from Union City, Jersey City, and Hoboken, New Jersey. The goal of the program is to promote interaction between the students and role models from within the Goddard Hispanic professional community.

Goddard Alliance

Throughout the past year, Goddard conducted a series of forums to inform community leaders, elected officials, industry leaders, and representatives from local agencies of Goddard's activities, future plans, and strategic goals and objectives. The Goddard Alliance, a newly formed organization of local community leaders, met with local elected officials to express their support of Goddard's strategic plans for the future.

Community Day

A total of 6,000 people attended the Community Days at the Goddard Visitor Center in April and October. The Visitor Center hosted another popular program, "Goddard at Night," weekly from September through April. The program included activities such as films and presentations on astronomical activities. Other events at the Visitor Center included participation in the Mars Pathfinder landing on July 4 and several model rocket launches, both at Greenbelt and the Wallops Flight Facility.

Noted Personnel

The unique diversity of personnel, from professional and administrative to scientists and engineers, contributed to the success that is the Goddard Space Flight Center. Many Goddard employees received special recognition in 1997 for their professional contributions and achievements.

Dr. John Mather, of the Space Sciences Directorate, was elected to the National Academy of Sciences in April. This honor is bestowed on individuals or teams in recognition of significant contributions to science. Dr. Mather is the second NASA scientist, and the second Goddard employee, to be named a member of the Academy.

Dr. Compton J. Tucker, of the Earth Sciences Directorate, was awarded the 1997 William T. Pecora Award for his achievements in the field of remote sensing. This award is sponsored jointly by the Department of Interior and NASA in recognition of outstanding contributions toward the understanding of the Earth by means of remote sensing. Dr. Tucker is honored specifically for his outstanding leadership in the use of remotely sensed data for ecology and in recognition of his pioneering applications of meteorological satellite data to study global vegetation dynamics.

Dr. Mary L. Cleave, the Project Manager for the Sea-viewing Wide Field-of-view Sensor (SeaWiFS) mission, has been awarded the NASA Engineer of the Year award for 1998. Dr. Cleave was selected for the award for outstanding technical and engineering expertise in managing and coordinating the SeaWiFS Project.

Dr. Robert A. Langel III, of the Earth Sciences Directorate, was the recipient of the 1997 William Nordberg Memorial Award for Earth Sciences. Dr. Langel was honored for his internationally recognized achievements in the study of the Earth's magnetic field from space, including leadership as Project Scientist for MAGSAT and the subsequent application of MAGSAT and other data to development of a new generation of geomagnetic field models, including the compilation of the first comprehensive global map of lithospheric magnetism.

Dr. Jack L. Bufton, of Goddard's Earth Sciences Directorate, was the recipient of the 1997 Moe. I. Schneebaum Memorial Award for Engineering. Dr. Bufton received the award in recognition of his exceptional and sustained contributions to NASA research and development in laser remote sensing and electro-optics.

Dr. Hasso B. Neimann, of Goddard's Earth Science Directorate, was the recipient of the John C. Lindsay Memorial Award for Space Science. Dr. Neimann received this award for his accomplishment as Principal Investigator of the Galileo Probe Mass Spectrometer and his lifelong accomplishments in the area of space flight mass spectrometry.

Mr. Dillard Menchan, Chief of Goddard's Equal Opportunity Programs Office, was recognized by the National United Cerebral Palsy Foundation with the Outstanding Community Service Award. Mr. Menchan was cited for significantly enhancing the lives of people with disabilities.

In Memoriam: Mr. Robert Baumann, Director of Flight Assurance, passed away on January 25, 1997. Bob was one of America's original space pioneers, transferring from the Naval Research Laboratory's Vanguard program to NASA when it was established in 1958. He was awarded the first U.S. satellite design patent in 1957. During his career at Goddard, Bob held positions of leadership and responsibility, and his contributions to Goddard were recognized by every organization at Goddard. In 1996, Bob received the Distinguished Service Medal, the highest honor NASA can bestow.

In honor of Bob and his contributions to NASA, the Center established the Robert C. Baumann Award for Safety and Mission Assurance. This award will be given annually in recognition of significant contributions to Safety and Mission Assurance by Goddard civil service employees.

Dr. John Mather

Dr. Compton Tucker

Dr. Mary Cleave

Dr. Robert Langel, III

Dr. Jack Bufton

Dr. Hasso Neimann

Mr. Dillard Menchan

Mr. Robert Baumann

External Awards and *Recognition*

Dr. Leonard F. Burlaga, of the Space Sciences Directorate, was elected as a Fellow of the American Geophysical Union (AGU). Dr. Burlaga was elected for his work on heliospheric physics and cosmic ray physics.

Dr. Carol Jo Crannell, of the Space Sciences Directorate, was elected as a Fellow of the American Association for the Advancement of Science (AAAS). Dr. Crannell was honored for her contributions to high-energy astrophysics, especially for the design of optics and detectors for solar gamma rays.

Dr. Anne R. Douglass, of the Earth Sciences Directorate, was elected as a Fellow of the American Meteorological Society (AMS). Dr. Douglass was recognized for her outstanding contributions to atmospheric sciences and in particular to stratospheric chemical modeling.

Dr. F. Landis Markley, of Goddard's Guidance, Navigation and Control Center, was elected a Fellow of the American Institute of Aeronautics and Astronautics (AIAA). Dr. Markley is internationally respected in the spacecraft attitude determination and control community.

Dr. Aprille Ericsson-Jackson, of Goddard's Guidance, Navigation and Control Center, was honored with the National Technical Association's Women in Science and Engineering Award for Engineering Achievement. Dr. Ericsson-Jackson specializes in optimal controller development and practical design procedures for space vehicle attitude control systems.

Ms. Hettie Courtney was recognized as NASA's Procurement Supervisor of the Year for her leadership in the Earth Sciences Procurement Office. Under her leadership, the office met a tight schedule for contract consolidation and performance-based contracting conversion, despite significant staff shortages.

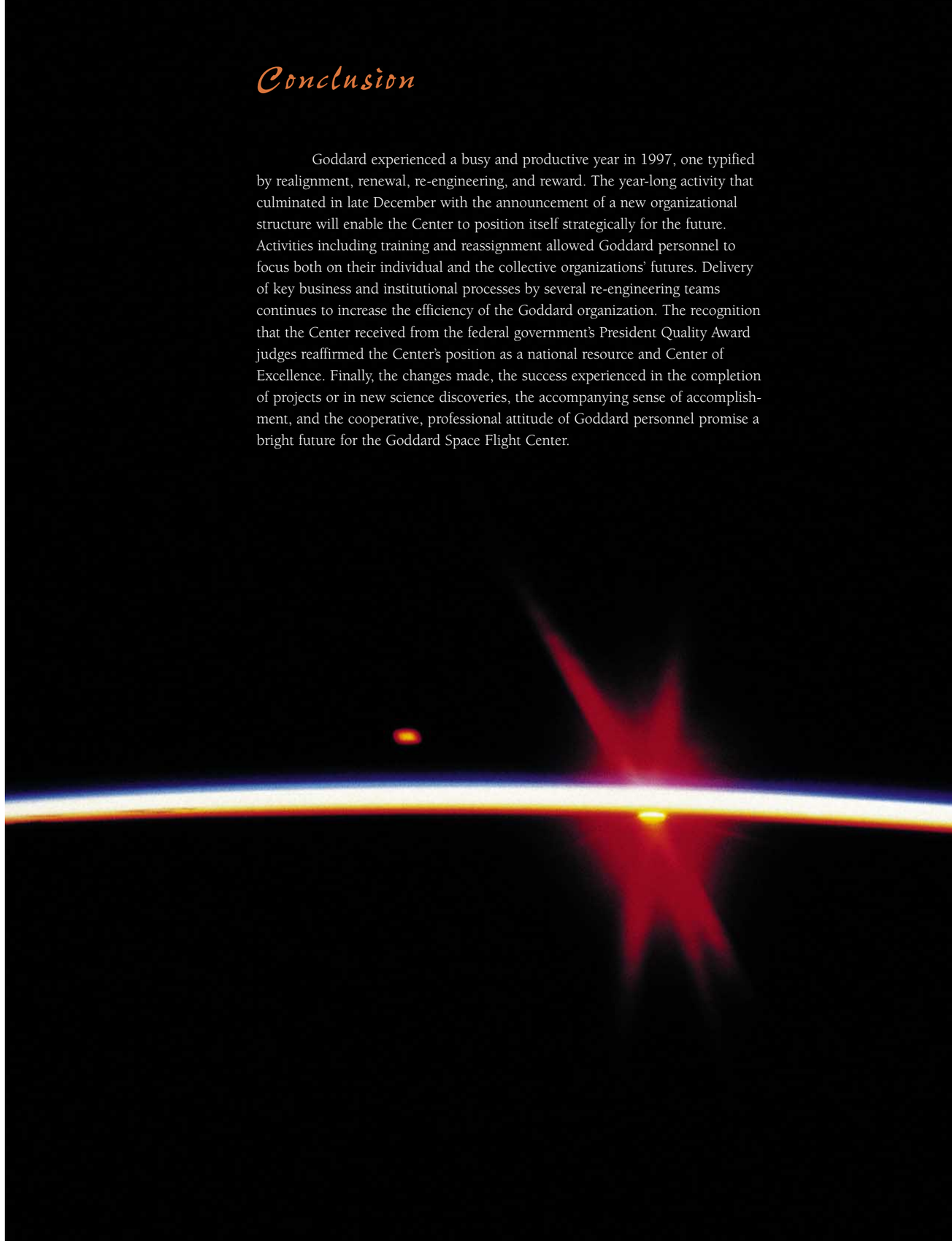
Ms. Adrian Jefferson was recognized as NASA's Grants Specialist of the Year for her leadership in the Grants Office during the transition of Agency grants to Goddard management. The NASA Grants Office, located at Goddard, awards and administers between 3,000 and 4,000 grants and cooperative agreements with members of the technical and scientific communities.

Ms. Theresa Keane was recognized as NASA's Procurement Support Person of the Year for her leadership of the Agencywide IFMP procurement module team. The IFMP procurement employs many innovative features that are new to both NASA and the procurement community.

Ms. Desiree Taminelli from the Management Operations Directorate was recognized by her peers, who nominated her in the Outstanding Clerical division to the Baltimore-Washington Federal Executive Board. Ms. Taminelli became Goddard's first Gold Medal winner in this category.

Conclusion

Goddard experienced a busy and productive year in 1997, one typified by realignment, renewal, re-engineering, and reward. The year-long activity that culminated in late December with the announcement of a new organizational structure will enable the Center to position itself strategically for the future. Activities including training and reassignment allowed Goddard personnel to focus both on their individual and the collective organizations' futures. Delivery of key business and institutional processes by several re-engineering teams continues to increase the efficiency of the Goddard organization. The recognition that the Center received from the federal government's President Quality Award judges reaffirmed the Center's position as a national resource and Center of Excellence. Finally, the changes made, the success experienced in the completion of projects or in new science discoveries, the accompanying sense of accomplishment, and the cooperative, professional attitude of Goddard personnel promise a bright future for the Goddard Space Flight Center.

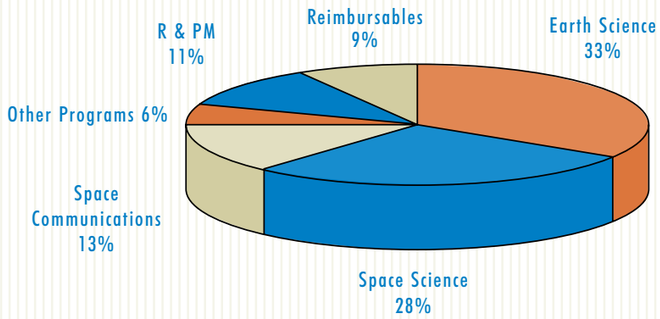


GODDARD FY97 BUDGET

The GSFC budget has had an upward trend for several years. Again in FY97 it was greater than in FY96 (a comparison of the amounts by major category is shown below). (Note: This represents Program Authority received in each Fiscal Year.)

	FY96 (in Millions of $)	FY97 (in Millions of $)
Earth Science	$ 898.6	$ 1,032.9
Space Science	$ 722.7	$ 836.8
Space Communications	$ 431.7	$ 396.2
Other Programs	$ 174.1	$ 171.7
R&PM	$ 306.9	$ 334.5
Subtotal Direct Appropriations	**$ 2,534.0**	**$ 2,772.1**
Reimbursables	$ 278.9	$ 265.2
Total	**$ 2,812.9**	**$ 3,037.3**

GODDARD BUDGET DISTRIBUTION



OVERVIEW OF FINANCIAL STATEMENTS

The FY97 financial statements have been formulated to present the financial position and results of operations of NASA's Goddard Space Flight Center pursuant to the requirements of the Chief Financial Officer's Act of 1990 and the Government Reform Act of 1994. These statements include: 1) The Statement of Financial Position, and 2) Statement of Operations and Changes in Net Position. The statements have been prepared from the official accounting and budgetary records of GSFC (Basic Accounting System and Fiscal System) in accordance with the form and contents prescribed by the Office of Management and Budget (OMB) Bulletin 94-01.

The statements should be read with the realization that they reflect the component of a sovereign entity; that liabilities not covered by budgetary resources cannot be liquidated without the enactment of an appropriation; and that payment of all liabilities, other than contracts, can be abrogated by the sovereign entity.

Three new appropriations originated in FY95: Human Space Flight (HSF), Science Aeronautics Technology (SAT) and Mission Support (MS) served to replace four other GSFC-funded appropriations: Space Flight Control and Data Communications (SFCDC); Research and Development (R&D); Research Program Management (R&PM); and Construction of Facilities (C of F). Actual expenses for all seven appropriations, in addition to the Office of Inspector General, and government and non-government reimbursable activities are reflected in the financial statements for FY97.

Accordingly, GSFC's Financial Statements represent funds for all years. The FY96 and FY97 budget consists of the new appropriations (HSF, SAT & MS) and for FY95 and prior four old appropriations (SFCDS, F&D, R&PM and C of F). The HSF appropriation provides funding for cooperative programs with Russia. The SAT appropriation provides funding for NASA's research and development activities, including all science activities, global monitoring, aeronautics, technology investments, education program, mission communication services, safety and quality assurance activities, and facilities construction activities to preserve the Agency's core infrastructure, and is provided by MS appropriation.

STATEMENT OF FINANCIAL POSITION

As of September 30, 1997

	FY97	FY96
Assets:		
Intragovernmental Assets:	(In Thousands of $)	(In Thousands of $)
Fund Balance with Treasury (Note 2)	$1,767,059	$1,521,384
Accounts Receivable, Net (Note 3) – Federal Claims	58,698	78,526
Advances and Prepayments	3,142	5,436
Governmental Assets:		
Accounts Receivable, Net (Note 3) – Non Federal Claims	3,064	4,857
Advances and Prepayments (Note 4)	—	84,941
Operating Materials & Supplies, Net (Note 5)	4,900	6,027
Property and Equipment, Net (Note 6)	2,680,260	2,493,480
Other Assets (Note 7)	151,964	262,284
Total Assets	**$4,669,087**	**$4,456,935**
Liabilities:		
Liabilities Covered by Budgetary Resources:		
Intragovernmental Liabilities:		
Accounts Payable	$102,056	$103,885
Other Liabilities (Note 8)	(2,587)	(1,257)
Governmental Liabilities:		
Accounts Payable	734,729	620,924
Lease Liabilities	1,089	2,766
Other Liabilities (Note 8)	12,683	8,357
Total Liabilities Covered by Budgetary Resources	**$847,970**	**$734,675**
Liabilities Not Covered by Budgetary Resources:		
Intragovernmental Liabilities:		
Other Liabilities (Note 8)	$166	$12,397
Governmental Liabilities:		
Other Liabilities (Note 8)	27,342	26,180
Total Liabilities Not Covered by Budgetary Resources	**27,508**	**38,577**
Total Liabilities	**$875,478**	**$773,252**
Net Position (Note 9)		
Balances:		
Unexpended Appropriations	$985,318	$950,896
Invested Capital	2,836,035	2,759,024
Cumulative Results of Operations (Note 10)	301	51
Future Funding Requirements (Note 10)	(28,045)	(26,288)
Total Net Position	**$3,793,609**	**$3,683,683**
Total Liabilities and Net Position	**$4,669,087**	**$4,456,935**

The accompanying notes are an integral part of these statements.

STATEMENT OF OPERATIONS AND CHANGES IN NET POSITION

For the Year Ended September 30, 1997

	FY97	FY96
Revenues and Financing Resources:	(In Thousands of $)	(In Thousands of $)
Appropriated Capital Used	$2,751,560	$2,651,732
Revenues from Sales of Goods & Services		
To the Public	14,624	2,720
Intragovernmental	303,102	282,365
Other Revenues and Financing Resources	356	739
Less: Receipts Transferred to Treasury	(356)	(739)
Total Revenues and Financing Resources:	**$3,069,286**	**$2,936,817**
Expenses:		
Program or Operating Expenses:		
Current Appropriations:		
Science Aeronautics and Technology	$2,108,756	$1,966,192
Human Space Flight	17,930	12,940
Mission Support	603,797	613,104
Office of Inspector General Current Year Costs	12	1
Noncurrent Appropriations:		
Space Flight Control and Data Communications	4,751	9,383
Research and Development	14,747	42,183
Research and Program Management	(14)	674
Construction of Facilities	1,295	7,255
Bad Debts and Writeoffs	36	0
Non-Government: Reimbursable Expenses	14,624	2,720
Government: Reimbursable Expenses	303,102	282,365
Total Expenses:	**$3,069,036**	**$2,936,817**
Excess, (Shortage) of Revenues & Financing Sources Over Total Expenses	**$250**	**0**
Changes in Net Position		
Nonoperation Changes:		
Invested Capital	$77,011	$490,287
Unexpended Appropriations	34,422	(6,292)
Future Funding Requirements	(1,757)	(3,602)
Total Nonoperation Changes:	**$109,676**	**$480,393**
Excess, (Shortage) of Revenues & Financing Sources Over Total Expenses and Nonoperation Change	**250**	**0**
Net Position, Beginning Balance	**$3,683,683**	**$3,203,290**
Net Position, Ending Balance	**$3,793,609**	**$3,683,683**

Notes to Financial Statements

For the Year Ended September 30, 1997

Summary of Accounting Policies and Operations – Note 1

Basis of Presentation

In accordance with NASA's CFO directive that installations begin the process of fulfilling the requirements legislated by the Chief Financial Officers Act of 1990 regarding the preparation of subject to audit financial statements (beginning fiscal year 1996), these statements were formulated from the books and records of GSFC in conformity with form and content procedures specified in OMB Bulletin 94-01.

Reporting Entity

GSFC is one of nine NASA field centers established to assist NASA in its mission to provide for aeronautical and space activities. The financial management of NASA's operations is the responsibility of Center officials at all organizational levels. Ultimately, the Financial Management Division, within the office of the Center's Chief Financial Officer, is responsible for synthesizing, aggregating, and reporting accounting events to NASA Headquarters and the Department of Treasury (for cash transactions), in accordance with Agencywide financial management regulations.

GSFC's overall accounting system consists of numerous feeder systems (e.g., Fiscal, OLCAS, BAS, NEMS, RAL), when combined, provide the basic information necessary to meet internal and external financial reporting requirements in terms of funds control and accountability. Albeit, it is recognized that the current systems environment does not meet OMB Circular A-127 requirements for a single integrated financial system.

The following seven appropriations require individual treatment and are distinctly classified in GSFC combined accounting and control systems:

(1) **HSF –** supports human space flight research and development activities for space flight, spacecraft control, and communications actions. This includes research, development, operations, services, maintenance, and construction of facilities, which encompass the repair, rehabilitation, and modification of real and personal property.

(2) **SAT –** provides for the conduct and support of science, aeronautics, and technology. Research, development, operations, services, maintenance, and construction of facilities (repair, rehabilitation, and modification of real and personal property) also serve as by-products of this appropriation.

(3) **MS –** funds safety, reliability and quality assurance activities in support of Agency programs, space communication services for NASA programs. The appropriation also provides budgetary resources for salaries, fringe benefits and related expenses, while supporting research and construction of facilities.

(4) **SFCDC –** provides for space flight, expendable launch vehicles, and spacecraft control, and communication activities, including operations, production services, related institutional activities, minor construction, maintenance, repair, rehabilitation and modifications. This appropriation was restructured and replaced in the FY95 NASA budget.

(5) **R&D –** includes research and development of the aeronautics and space research, related institutional activities. This appropriation was restructured and replaced in the FY95 NASA budget.

(6) **R&PM –** funds civil servant salaries, fringe benefits, training, travel, and related expenses to manage and conduct NASA programs within GSFC. This appropriation was restructured and replaced in the FY95 NASA budget.

(7) **Cof F –** provides budgetary resources for construction, repair , rehabilitation and modification of facilities, minor construction of new facilities and additions to existing structures, and facility planning and design. This appropriation was restructured and replaced in the FY95 NASA budget.

(8) **OIG –** Budgetary resources made available to fund necessary OIG salary, travel and related expenses required to conduct audits and investigations of Center activities.

The GSFC Reimbursable Program received resources authority of $475 million during FY97. Of this amount, $275 million was used to fund firm reimbursable agreements. GSFC is the leading Center at NASA in providing products and expert services to the scientific and engineering communities on a reimbursable basis. Most of theses services are provided to the government sector (e.g., NOAA and DOD). In fact, reimbursable activity constitutes over 10 percent of total expenses reported in FY97.

Basis of Accounting

GSFC accounts are maintained on an accrual basis (i.e., expenses are recorded when incurred and revenue when earned). Expenses are classified in the accounts by appropriation in accordance with the Agencywide coding structure, which sets forth a uniform classification of financial activity that is used for planning, budgeting, accounting, and reporting. The expenses are further categorized in the General Ledger as operating or capitalized expenditures.

Advances

GSFC distributes the majority of its funding used for the University Contracts and Grants Program by the method of Letter of Credit through the Health and Human Services (HHS) Program Management System (PMS). Next to the NASA Headquarters Financial Management Division, GSFC generates the largest pool of funds under this program in NASA. The HHS serves as an agent for the U.S. Treasury in processing the drawdown of funds (disbursements) from a pre-established balance set up by GSFC based on contract/grant awards. The established balance for each university constitute advance payments. A smaller number of university contract/grant recipients receive advance payments on a quarterly basis via check payments through the U.S. Treasury system. Quarterly financial reporting of transactions is provided by recipients on Federal Cash Transactions Reports (SF 272s) in accordance with OMB Circular A-110. Detailed monitoring, funds control (against outstanding obligations), and accountability records are maintained. In addition, audits by the Defense Contract Audit Agency and NASA's OIG support this monitoring.

Property, Plant, and Equipment

GSFC-owned Property, Plant, and Equipment (PP&E) may be held by the Center or its contractors. Under the provisions of the Federal Acquisition Regulation (FAR), contractors are responsible for control over and accountability for such property in their possession. The GSFC General Ledger is capable of classifying Government-held PP&E from Contractor-held PP&E separately.

Government regulation does not make a provision for depreciating PP&E under appropriated funding authority. However, in accordance with the User Charge Act and OMB Circular A-25, NASA is permitted to assess depreciation charges for the use of facilities and equipment, under the "full cost" concept, to non-government reimbursable customers. GSFC is in the infancy stage of formulating a methodology in which to assess depreciation charges for commercial reimbursable activity. In addition, automated data processing software is treated as operating cost rather than capitalized, in accordance with GAO Title II guidelines.

Equipment with a unit cost of $500 or more and a useful life of two years or more, that will not be consumed in an experiment, is capitalized. Capitalized cost includes unit cost, transportation, installation, and handling and storage cost. Real property such as land, buildings, and other structures and facilities, is capitalized when the asset value is $1000 or more. The capitalized value represents the total to NASA, including both acquisition and preparation cost. Land values are recorded at original acquisition cost and do not reflect current market value or include cost of improvements. Buildings are also valued at acquisition cost, including the cost of capital improvements and fixed equipment required for functional use of the facility.

Government-owned/contractor-held property includes GSFC real property, such as land, buildings, and structures, materials, plant equipment, space hardware, special tooling, and special test equipment. Contractors are directed to annually report (on NASA Form 1018) plant equipment

costing $5000 or more and having a useful life of two years and will not be consumed in an experiment. In addition, this reporting includes capturing the other property categories mentioned above, regardless of the value (although most exceeds $5000), and is included in the Statement of Financial Position. This reporting is certified by the contractor's representative and reviewed by a government property administrator. Space hardware work-in-progress represent the largest amount of assets owned by GSFC.

Revenues and Other Financing Sources

GSFC receives the majority of its funding through multi-year appropriations. These include three-year appropriations for construction activities, two-year appropriations for operational and space flight activities, and a single year appropriation for civil service payroll and travel. In addition to appropriated funds, the Center performs services for other Federal agencies and the public sector while receiving reimbursable authority.

FUND BALANCES WITH TREASURY – NOTE 2

	Obligated Available	Unobligated	Restricted	Total
Appropriated Funds	$1,448,123	$299,767	$9,219	$1,757,109
Deposit Funds for Reimbursable Advances	9,950	0	0	9,950
Total Funds Balance with Treasury	**$1,458,073**	**$299,767**	**$9,219**	**$1,767,059**

GSFC cash receipts and disbursements are processed by the U.S. Treasury. The funds with the U.S. Treasury include appropriated funds, trust funds, and deposited funds for advances received for reimbursable services. Cash balances held outside the U.S. Treasury are not significant.

ACCOUNTS RECEIVABLE – NOTE 3

	Entity Accounts Receivable	Allowances for Losses on A/R & Int	Net Amount Due
Intragovernmental	$58,736	$(38)	$58,698
Governmental	3,064	0	3,064
Total Accounts Receivable	**$61,800**	**$(38)**	**$61,762**

Accounts Receivable consist of amounts owed to GSFC by other Federal Agencies and amounts owed by the public. NASA establishes an allowance amount for reporting purposes based on an analysis of outstanding receivable balances. Most receivables are due from other Federal Agencies for reimbursement of services. Non-federal customers provide advance payments which are placed on deposit with the U.S. Treasury until services are performed.

ADVANCES AND PREPAYMENTS – NOTE 4

	FY97	FY96	Change
Government Assets:	0	$84,941	$(84,941)

The variance shown above results from a change in the application of accounting principle. Based on the correct application of government accounting principles, the amount resulted in a decrease to advances and prepayments and an increase to accounts payables (Government Liabilities).

NOTES TO THE FINANCIAL STATEMENT

OPERATING MATERIALS AND SUPPLIES – NOTE 5

	FY97	FY96	Change
Stores Stock	$4,855	$5,981	$(1,126)
Standby Stock	45	46	(1)
Total Operating Materials and Supplies	**$4,900**	**$6,027**	**$(1,127)**

In accordance with FASAB promulgation, materials held by GSFC, which are repetitively procured, stored, and issued on the basis of recurring demand are considered Operating Material and Supplies

PROPERTY, PLANT, AND EQUIPMENT – NOTE 6

Government-owned/Government-held	FY97	FY96	Change
Land	$3,351	$3,351	0
Structures, Facilities & Leasehold Improvements	506,718	484,279	22,439
Equipment	738,294	730,924	7,370
Assets Under Capital Lease	12,911	13,613	(702)
Construction in Progress	1,144,253	992,265	151,988
Total	**$2,405,527**	**$2,224,432**	**$181,095**

Government-owned/Contractor-held	FY97	FY96	Change
Land	0	0	0
Structures, Facilities & Leasehold Improvements	14,427	10,492	3,935
Equipment	92,086	93,130	(1,044)
Special Tooling	16,371	12,029	4,342
Special Test Equipment	97,981	92,233	5,748
Space Hardware	53,868	61,164	(7,296)
Total	**$274,733**	**$269,048**	**$5,685**
Grand Total	**$2,680,260**	**$2,493,480**	**$186,780**

GSFC-owned Property, Plant, and Equipment (PP&E) may be held by the Center or its contractors. Government-owned/Contractor-held property includes GSFC real property, such as land, buildings and structures, materials, plant equipment, space hardware, special tooling, and special test equipment. Contractors are directed to annually report (on NASA Form 1018) plant equipment costing $5000 or more and having a useful life of two years and will not be consumed in an experiment. The 1018 reporting as certified by the contractor's representative and reviewed by a government property administrator. Space hardware work-in-progress represent the largest amount of assets owned by GSFC.

NOTES TO THE FINANCIAL STATEMENT

OTHER ASSETS – NOTE 7

	FY97	FY96	Change
Contractor-Held Materials	$151,964	$186,533	$(34,569)
Program Stock	0	50,265	(50,265)
Personal Property Held by the Disposal Officer	0	25,486	(25,486)
Total	**$151,964**	**$262,284**	**$(110,320)**

These assets include Government-owned/Contractor-held materials.

OTHER LIABILITIES – NOTE 8

Liabilities Covered By Budgetary Resources:	Current	Non-Current	Total
Intragovernmental Liabilities:			
Liabilities for Deposit and Suspense Funds	$(2,975)	0	$(2,975)
Liabilities for Stat Reim cost	$388	0	$388
Total	**$(2,587)**	**0**	**$(2,587)**
Governmental Liabilities:			
Liabilities for Deposit and Suspense Funds	$12,673	0	$12,673
Liabilities for Stat Reim Cost	$10	0	$10
Total	**$12,683**	**0**	**$12,683**
Total Liabilities Covered by Budgetary Resources	**$10,096**	**0**	**$10,096**

Liabilities Not Covered By Budgetary Resources:	Current	Non-Current	Total
Intragovernmental Liabilities:			
Accounts Payable for Closed Appropriation		$166	$166
Liabilities for Receipts Accounts	0		0
Total	**0**	**$166**	**$166**
Governmental Liabilities:			
Accounts Payable for Closed Appropriation		$3,382	$3,382
Liabilities for Receipts Accounts		2	2
Unfunded Annual Leave		23,958	23,958
Total	**0**	**$27,342**	**$27,342**
Total Liabilities Not Covered By Budgetary Resources	**0**	**$27,508**	**$27,508**
Grand Total	**$10,096**	**$27,508**	**$37,604**

Accounts payable includes amounts recorded for receipt of goods or services furnished to the Center but not disbursed. Additionally, throughout GSFC, cost is recognized and accrued based on information provided monthly by contractors on cost and performance reports NASA Form 533 (NF 533), the Contractor Financial Management Report. The DCAA performs independent audits on reported cost to ensure reliability of estimates. Also, further assurance is provided by GSFC resource analysts as a result of examining cost accruals generated from the NF 533s.

NET POSITION – NOTE 9

	Appropriated Funds
Unexpended Appropriations	
Undelivered	$676,332
Unobligated:	
Available	299,767
Unavailable	9,219
Invested Capital	2,836,035*
*(See Note 10)	
Cumulative Results of Operations	301
Future Funding Requirements	(28,045)
Total Net Position	**$3,793,609**

HEADQUARTERS ADJUSTMENTS – NOTE 10

*Invested Capital Computation

Property, Plant, and Equipment	$2,680,260
Other Assets	151,964
Operating Materials and Supplies	4,900
Less Liability for Capitalized Leases	(1,089)
Invested Capital	**$2,836,035**

GODDARD UNCOSTED REDUCTION PROJECT

The Goddard Uncosted Reduction Project (GURP) was inaugurated by Center Director, Joseph H. Rothenberg, in September 1997. In announcing the Project, Mr. Rothenberg indicated that a Center self-assessment resulted in recognizing that it was necessary to "projectize" our efforts to solve the Center's uncosted carryover problem. Because of the far reaching impact of uncosted carryover within the Agency and at the Center, Mr. A.V. Diaz, then Deputy Director and now Center Director, decided to personally lead this effort as the Project Manager. The Center's new Deputy Director, Mr. William Townsend, has now taken over as Project Manager. Since inception, the Project has initiated many activities directed towards solving the Center's uncosted carryover problem.

The Project's principal goal is to reduce the Center's uncosted carryover to minimum required levels as soon as possible, but not later than the end of FY99. Specific goals are to: (1) improve the Center's capability to accurately estimate cost plans; (2) "work-off" excess uncosted funding authority (within approved program/project authority) that was carried forward from FY97; (3) eliminate the growth of new uncosted funding authority; and (4) optimize the use of appropriated funds so as to maximize progress and cost effectiveness.

In December 1997, the Project completed its first major initiative by reassessing the Center's FY98 cost phasing plans that were originally developed for the POP 97-1 exercise. Due to a variety of factors, the Center's planned uncosted carryover leaving FY98 was reduced by $108M from $776M to $668M. Accomplishing this plan will represent a $335M reduction to the Center's uncosted carryover of $1003M leaving FY97. The Project is currently implementing a number of initiatives designed to closely monitor and control the Center's cost performance for the remainder of this fiscal year. We are also beginning to consider initiatives that will continue into FY99 and beyond.

Michael W. Kelly
Deputy Project Manager/Resources
GURP Project

1996 PRESIDENTIAL RANK RECIPIENTS

	CODE/AFFILIATION
DISTINGUISHED EXECUTIVE IN SES	
A. V. Diaz	100
Sharon C. Foster	200
MERITORIUS EXECUTIVE IN SES	
W. Brian Keegan	700
James V. Moore	400

1997 NASA HONOR AWARDS

DISTINGUISHED SERVICE MEDAL	
Donald A. Krueger	730
DISTINGUISHED PUBLIC SERVICE MEDAL	
Lyle J. Holloway	McDonnell Douglas
OUTSTANDING LEADERSHIP MEDAL	
Dixon M. Butler	170
Richard M. Day	701
Carroll G. Dudley	500
Phillip A. Sabelhaus	415
Jean H. Swank	662
Darrel L. Williams	923
EXCEPTIONAL ACHIEVEMENT MEDAL	
Sharon D. Arneson	503
Frank H. Bauer	712
Sherrie L. Butler	211
William J. Campbell	935
Candace C. Carlisle	505
Michael K. Choi	724
Karen E. Flynn-Newlon	221
William S. Guion	504
Thomas W. Hamilton	903
Curtis E. Johnson	151
Ruthan Lewis	740
Dino Machi	404
Robert J. Martineau	718
Linda K. Pacini	701
John A. Ruffa	735
Dale F. Schulz	426
Steven S. Scott	704
Mary V. Stevens	214
Thomas E. Wallace	741
William A. Watson	530
William D. Worrall	630
EXCEPTIONAL SERVICE MEDAL	
W. James Adams	424
Elizabeth E. Beyer	441
Kristi S. Brown	704
D. Bryant Cramer	704
Daniel S. DeVito	505
Joseph A. Dezio	406
Kenneth E. Ford	170
Michele L. Garret	210
Arthur F. Hasler	912
George P. Kramer, Jr.	311
Hongwoo Park	721
Kelly L. Pecnick	903
David L. Pierce	802
Peter K. Shu	718
Kenneth O. Sizemore	405
Lynne G. Slater	120
H. Ray Stanley	802
Cynthia J. Stoltz	214
Paul A. Thompson	227
Vaughn E. Turner	540
Diane E. Williams	400
Catherine M. Windsor	300
Claudia M. Woods	723
EXCEPTIONAL SCIENTIFIC ACHIEVEMENT MEDAL	
George R. Carnignan	Univ. of Michigan
Michael J. Mumma	690
Hasso B. Niemann	915
EXCEPTIONAL ENGINEERING ACHIEVEMENT MEDAL	
Stephen H. Castles	713
Oswald Siegmund	Univ. of CA
Pen-Shu Yeh	738
EQUAL EMPLOYMENT OPPORTUNITY MEDAL	
James E. Hansen	940

GROUP ACHIEVEMENT AWARD

EOS Common Spacecraft SEB 700
Thomas J. Magner 701
FAST Development and Launch Team 701
David F. Everett 704
GGS/WIND Polar MODS Implementation Team 500
Robert J. Menrad 501
Global Change Master Directory 902
Paul H. Chan 902
GSFC Project Parts Acquisition Team 235
Dale R. Hupp 230
ISTP/GGS Coordinated Data Analysis Group 632
Robert E. McGuire 632
ISTP/SOHO MODS Implementation Team 500
Robert J. Menrad 501
MELVS Launch Team 470
David F. Mitchell 470
MIDEX Contract Team *410*
Richard I. Weiss 410
NEAR Infrared Camera and Multi-object Spectrometer CIRCE Team 442
Paul H. Geithner 442
Space Experiment Module Concept Develop and Instrumentation Team 700
Ruthan Lewis 740
SPIRAC Instrument Development Team 723
George M. Voellmer 723
TOMS EP Mission Group
Phillip A. Sabelhaus 415
WSGTU Project Team 530
Denver W. Herr 530

PUBLIC SERVICE MEDAL

Luis Gonzales — Computer Sciences Corp.
James M. Young — Santa Barbara Research Ctr.

PUBLIC SERVICE GROUP ACHIEVEMENT AWARD

Delta II Avionics Upgrade Team 400
Henry J. Dhuyvetter
The Goddard Visitor Center's Model Rocket Launch Team 130
Glenn E. Pearson, Jr

1997 GODDARD HONOR AWARDS

EXCEPTIONAL ACHIEVEMENT AWARD

Charles S. Adams 752
John D. Baniszewski 214
Pawan K. Bhartia 916
David L. Burkhead 821
Lourdes F. Carson 214
John F. Cavanaugh 924
P. R. K. Chetty 745
Thomaseena A. Cox 200
John J. Deily 712
Jody S. Fillman 205
Andreí S. Fortin 531
Claudia S. Fulk 821
Brantley E. Furness 821
Timothy D. Gruner 745
John G. Hagopian 717
Robert C. Hartman 661
Alan T. Johns 510
Timothy R. Kallman 662
Benjamin Kedem 910
Richard D. Kinder 743
Arletta R. Love 110
Michelle D. Marrie 415
Charles M. Melhorn 480
Paul E. Mills 222
William H. Mish 694
Armando Morell 723
Ronald M. Muller 170
Bonnie G. Norris 701
Frank J. On 721
Thomas J. Paprocki 201
Michael E. Plants 733
Linda D. Price 503
John E. Robinson 408
John L. Scheifele 695
William J. Schiavone 422
Sylvia B. Sheppard 522
David A. Short 910
Francis E. Snow 501
Michael F. Stark 551
Louis J. Stieff 690
Ann M. Travis 424
Marilyn C. Tolliver 231
Craig R. Tooley 741
Joseph W. Toth 551

AWARD OF MERIT

Robert A. Baumann *(Posthumously)* 300
Jane E. Jellison 313
Louis S. Walter 900

PRODUCTIVITY IMPROVEMENT AND QUALITY ENHANCEMENT AWARD

Henry J. Middleton 205
Jose O. Santos 700
Cynthia L. Tart 212

PRODUCTIVITY GROUP AWARDS

The ACE Common Ground System Development Team 410
Consolidated NMOS Planning and Flight Dynamics Division (FDD) Reengineering Team 550
Vicki Pendergrass
GSFC TV Working Group Implementation Teams 130
Richard C. Tagler 500
William S. Guion
William Kelly
Glenn P. Stewart
B. J. Hayden
TDRSS/ELV Team 530

EQUAL OPPORTUNITY AWARD

Sharon B. Johnson 201

COMMUNITY SERVICE AWARD

Wanamaker Lawrence 233
Leslye A. Boyce 424

GROUP ACHIEVEMENT AWARDS

The ADEOS Automation Team 822
David L. Davis
Jeffrey L. Dorman
ADEOS Data Stripper and FAST Packet Processing System In Engineering Teams 521
Johnny E. Medina
Building 24 Chill Water System Project Design & Construction Management Team 224
William P. Koch
The Control Center Software Support Team 822
Susan K. Semancik
Forrest M. Mooney
The Earth Sciences Administration and Resources Management Office 903
EUVE Explorer Platform Flight Operations Team 631
William J. Guit
The Forest Ecosystem Dynamics Project 923
K. Jon Ranson
GOES Imager/Sounder Motor Anomaly Resolution Team 415
Claudia M. Woods
GPS Test Facility Development Team 712
Semion Kizhner
GSFC Strategic Plan Team 100
Dorothy J. Zukor
Infrared Spectral Imaging Radiometer (ISIR) Team 912
McDonnell Douglas Aerospace Corporation (MDAC) Group 470
Darryl Van Dorn
The Next Generation Space Telescope (NGST) Team 440
Bernard D. Seery 710
John C. Mather 685
Operational GOES Support Team 415
The President's Award Application Team (PAAT) 100
The President's Quality Award Site Visit Preparation Team 100
Printing, Publications, & Graphics (PPG) Team 253
Susan V. Hart
Regional Validation Center Development Team 935
William J. Campbell
RXTE SOF Operations Group 662
Robin H. Corbet
SMEX Lite Architecture Development Team 701
Timothy G. Trenkle
Spartan 201-03 Mission Team 741
Craig R. Tooley
White Sands Ground Terminal Upgrade Project Contractor Team 530
Denver W. Herr

RECIPIENTS OF 1997 SECRETARIAL/CLERICAL AWARDS

Shannell C. Cardwell	920
Lisa R. Carroll	440
Nita A. Curry	170
Delores E. Curtis	530
Margaret A. Dick	743
Catherine E. Donnelly	218
Dawn A. Feick	140
Valorie A. Fleming	254
Vicki T. Gaunt	153
Patricia A. Golden	910
Joan E. Harris	660
Felicia Harrison	701
Tammie J. Howcott	204
Michelle R. Jackson	130
Tracey A. Jones	217
Lou Jean Jackson	303
Tara L. Lausch	735
Cheryl D. Lee	530
Lou Etta Milstead	415
Marjorie A. Pasini	630
Tammy L. Posey	100
Jean M. Raymond	220
Mary A. Reboso	205
Katherine A. Richardson	200
Amy J. Taylor	833
Sherita F. Tongue	542
Joan M. Walton	530
Lisa J. Ward	800
Paula L. Wood	408

ANNUAL GODDARD SAFETY AWARDS CEREMONY

SAFETY AWARD OF MERIT

Name/Group Accepting

John J. Hillman	690
Richard A. Karas	222
Peter E. Monti	718
Building 24 Mishap Group	
James T. Harper	302
William P. Koch	224
T. A. Papadimitris	202
Ralph J. Strnad	226
Paul A. Thompson	227
John T. Van Sant	313

FACILITIES OPERATIONS MANAGER AWARD

Leslie E. Bunting	831
Joseph J. Eck	514

HUMANITARIAN AWARD

Eagle Maintenance
Valerie Board
Hall's Security Analysts, Inc.
Officer Myron L. Jeter
Officer Mark C. Molter
Officer John P. O'Connor
Ronald A. Raffo

CONTRACTOR SAFETY AWARD

AlliedSignal Technical Services Corporation
Robert W. Whitfield
Dyncorp
Robert N. Gidge
Hernandez Engineering, Inc.
Shirley K. Dion
Albert E. Powel
Claire Redlund
National Health Services
Tad M. Blanchard
Theodore D. Simmons II
OMNE NSI Recertification Support Group at GSFC Wallops Flight Facility
Sandra L. Broadwater
Donald E. Burger
David C. Burtis
Melvin J. Crompton
Beverly J. Hall
Ronald C. Hall
William T. Hargrove
Henry L. Henry
Richard J. Gayo
Lewis W. Johnson
James P. McDonough
Fred T. Richards, Jr.
Thomas P. Schafer
Charles R. Tingle
Leonard B. Venzke
Raymond J. Whitehead
Mr. Edward C. Wieneke
Mr. Allan N. Winters
Mr. Albert G. Zorn
OMNE/Wallops Flight Facility Fire Department
Chief Kenneth W. Ainsworth, Jr.

SAFETY HONORABLE MENTION AWARD

Facilities Operations Manager (FOM) and Facilities Management Group (FMG)

Quinton E. Barker	510
Richard W. Bingham	Parsons
Charles Brooks	754.2
Alfred W. House	ATSC
Deborah S. Janssen	ATSC
Michael S. McDiarmid	ATSC
Jon M. Savage	ATSC

GSFC Equal Opportunity Advisory Committee on People with Disabilities

Lynn B. Clark	214
Rodney C. Fossett	222
David L. Jacintho	550
Robert E. Lussier	734
Boyd A. Pearson	303
Kent F. Potter	221
Maryellen Ramsey	224
Richard C. Rogers	831

STS-82 SPACE FLIGHT AWARENESS LAUNCH HONOREES

Civil Service

Charles M. Duignan	542
Jeffrey J. Gramling	405
Robert W. Jenkens, Jr.	405

AlliedSignal Technical Services Corporation
Robert Cass
David L. Davies
Douglas E. Grove
Steven E. Sypher
Computer Sciences Corporation
Merri B. Benjamin
James P. Chernega
Linda L. Stewart
Jackson and Tull
Ireneusz Orlowski
Lockhead Martin Space Mission Systems and Services
Dale D. Shama
NSI
Kevin W. Redman
Orbital Sciences Corporation
Raymond E. Bietry, Jr.
Robert K. Ritter

STS-84 SPACE FLIGHT AWARENESS LAUNCH HONOREES

Civil Service

Michael C. Bruegge	542
Thomas W. Collinson	745
Andrew B. Dougherty	704
Gilbert W. Ousley, Jr.	724
Barbara B. Pfarr	510
Elender J. Pouncy	550
Todd G. Sanders	224

AlliedTechnical Services Corporation
David E. Murphy
Steven B. Testoff
Computer Sciences Corporation
Gregory V. Kurtz
CTA, Inc.
Ronald D. Kiefer
Hughes Danbury Optical Systems
Raymond F. Douglass
Richard J. Sibilio
Lockheed Martin Space Mission Systems & Services
George Gibson
Lockheed Martin Technical Operations
Joel Sills, Jr.

STS-86 SPACE FLIGHT AWARENESS LAUNCH HONOREES

Civil Service

James D. Blackwood	740
Eric K. Isaac	704
Robyn L. King	38
Katherine A. Richardson	200
Ted C. Sobchak	532
Devin Tailor	722

AlliedSignal Technical Services Corporation
Charles A. Downs, Jr.
Albert W. Duany
Michael J. Kohout
Boeing Company
James E. Corbo
Justin C. Cassidy, Jr.
Computer Sciences Corporation
Susan M. Good
International Computer Telecommunications Inc.
Jane R. Love
Lockheed Martin Technical Operations
Dennis C. Connolly
Richard G. Fink
Brian W. Woodworth
Orbital Sciences Corporation
Sofia M. Stachel

Acronym List

AAAS	American Association for the Advancement of Science
ACCESS	Achieving Competence in Computing, Engineering, and Space Science
ACE	Advanced Composition Explorer
ADEOS	Advanced Earth Observing Satellite
AETD	Applied Engineering and Technology Directorate
AGS	Alaska Ground Station
AGU	American Geophysical Union
AIAA	American Institute of Aeronautics and Astronautics
AMS	American Meteorological Society
AOTF	Acousto-Optical Tunable Filters
ARC	Ames Research Center
ARISS	Amateur Radio International Space Station
ASCA	Advanced Satellite for Cosmology and Astrophysics
ATM	Airborne Terrain Mapping
CCD	Charge Coupled Device
CGRO	Compton Gamma Ray Observatory
CIRS	Composite InfraRed Spectrometer
COBE	Cosmic Background Explorer
COTS	Commercial-Off-The-Shelf
EGRET	Energetic Gamma Ray Experiment Telescope
EIS	Executive Information System
EUV	Extreme Ultraviolet
EVA	Extra-Vehicular Activity
FY	Fiscal Year
GCMS	Gas Chromatograph-Mass Spectrometer
GOES	Geostationary Operational Environmental Satellite
GPS	Global Positioning System
GSA	General Services Administration
GSFC	Goddard Space Flight Center
HACE	Hispanic Advisory Committee for Employees
HESSI	High Energy Solar Spectroscopic Imager
HST	Hubble Space Telescope
IDIQ	Indefinite Delivery, Indefinite Quality
IEH	International Extreme Ultraviolet Hitchiker
IFMP	Integrated Financial Management Project
IMDC	Integrated Mission Design Center
INMS	Ion and Neutral Mass Spectrometer
ISO	International Standards Organization
ISTP	International Solar-Terrestrial Physics
JPL	Jet Propulsion Laboratory
JSC	Johnson Space Center
KSC	Kennedy Space Center
LaRC	Langley Research Center
LAM	Laser Altimetry Mission
MAGSAT	Magnetic Field Satellite
MAP	Microwave Anisotropy Probe
MASAREDI	Magnetically Suspended Actively Reduced Dynamic Imbalance
MGS	Mars Global Surveyor
MIDEX	Mid-class Explorer
MOBY	Marine Optical Buoy
MSFC	Marshall Space Flight Center
MURC	Manpower Utilization Review Council
NASA	National Aeronautics and Space Administration
NASDA	National Space Development Agency
NGST	Next Generation Space Telescope
NICMOS	Near Infrared Camera and Multi-Object Spectrometer
NSCAT	NASA Spectrometer
OPM	Office of Personnel Management
PQA	President's Quality Award
R&D	Research and Development
RSDO	Rapid Spacecraft Development Office
RVC	Regional Validation Center
RXTE	Rossi X-Ray Timing Explorer
SAFER	Simplified Aid for EVA Rescue
SAREX	Shuttle Amateur Radio Experiment
SeaWiFS	Sea Viewing Wide Field-of-View Sensor
SEM	Space Experiment Module
SGS	Svalbard Ground Station
SKILL	Scientific Knowledge for Indian Learning and Leadership
SLA	Shuttle Laser Altimetry
SMEX	Small Explorer
SOHO	Solar and Heliospheric Observatory
SSPP	Shuttle Small Payloads Project
STAAC	Systems, Technology and Advanced Concepts
STIS	Space Telescope Imaging Spectograph
STS	Space Transportation System
TAS	Technology Applications and Science
TOMS	Total Ozone Mapping Spectrometer
TRACE	Transition Region and Corona Explorer
TRMM	Tropical Rainfall Measuring Mission
ULDB	Ultra Long Duration Balloon
UPOP	Ultra-Precision Optics Partnership
US	United States
VCL	Vegetation Canopy Lidar
WFF	Wallops Flight Facility
WPI	Worcester Polytechnic Institute
WWW	World Wide Web

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Back Cover: The Hubble Space Telescope is set into orbit by the crew of STS-82 following its second successful on-orbit servicing.